Ch. 29 Potential and Field

P. 2, 4, 35

C. 1

29.P.2 Potential Difference

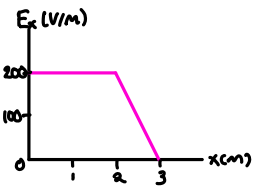
$y_0 = -5\text{cm}$ $y_1 = 5\text{cm}$

$\vec{E} = 20{,}000\hat{\imath} - 50{,}000\hat{\jmath}$ V/m

$$\Delta V = -\int \vec{E}\cdot d\vec{s}$$
$$= -\int_{-5}^{5} -50{,}000\, dy$$
$$= -(-500{,}000 \text{ V/m})$$
$$\Delta V = 500{,}000 \text{ V/cm}$$
$$\Delta V = 5{,}000 \text{ V/M}$$

$\Delta V = 5{,}000$ V

29.P.4



$V_0 = -50$ V

$V_3 = -550$ V

$V(x=3\text{cm}) = -550$V

$V_0 + V_3 = -50\text{V} - 500\text{V}$
$= -550$V

$A = 2(200) + \frac{1}{2}(1)(200)$
$= 400 + 100$
$A = 500$ $\vec{E}\cdot d\vec{s} = 500$

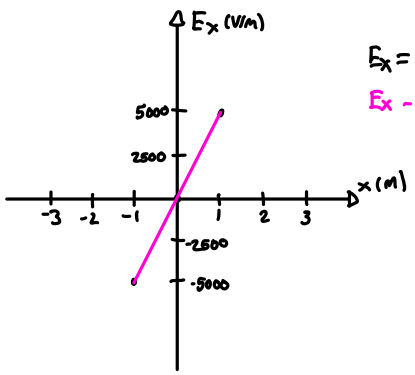
$\Delta V = -\int \vec{E}\cdot d\vec{s}$

$\Delta V = -500$V

29.P.35

$E_x = 5000x$ V/m

a.



$E_x = 5000x$

E_x $-1\text{m} \le x \le 1\text{m}$

b.

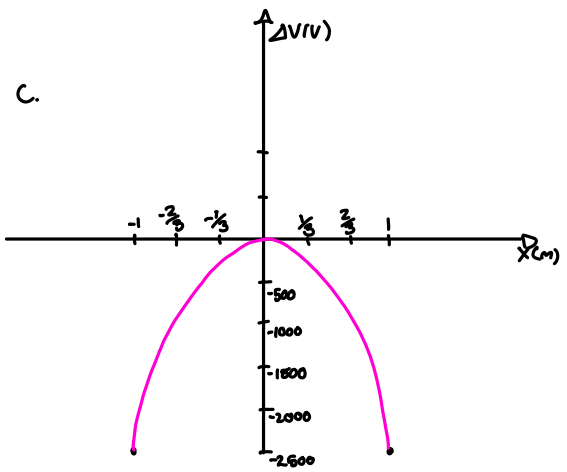
$\Delta V = -\int \vec{E}\cdot d\vec{s}$

$\vec{E}_x = 5000x$ V/m

$\Delta V = -\int 5000x\, dx$
$= -(2500x^2)$
$\Delta V = -2500x^2$

$\Delta V = -2500x^2$

c.



Conceptual

29.C.1

$\Delta V = -\int \vec{E}\cdot d\vec{s}$
$= -\int 100\, dx$
$= -(100x)$
$\Delta V = -100x$